UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/587,813	06/06/2000	Martyn Lott	AP32618(065838.0195)	8496

21003 7590 03/21/2002

BAKER & BOTTS
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER
LEE, SIN J

ART UNIT	PAPER NUMBER
1752	8

DATE MAILED: 03/21/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/587,813	Applicant(s) LOTT ET AL.	
	Examiner Sin J Lee	Art Unit 1752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 January 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6 and 8-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *9* is/are allowed.

6)☒ Claim(s) *1-6,8 and 11-21* is/are rejected.

7)☒ Claim(s) *10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

1. Claim 7 is canceled by applicants.

2. Applicants' amendment as to replacing the paragraph of pg.10, lines 16-19 of present specification with the paragraph shown on pg.2 of the amendment is not entered for the following reasons: First of all, the section to which applicants are referring (pg.10, lines 16-19) is not a full paragraph. Secondly, it is the Examiner's position that applicants meant to replace the paragraph at pg.10, lines 12-15 instead. Since the amendment is not being entered, the previously made objection to present specification for failing to provide proper antecedent basis for the claimed subject matter of previous claim 7 (which is now incorporated into claim 1) is being maintained as shown below.

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: There is no antecedent basis for the subject matter of claim 1, "wherein the precursor is held at an elevated temperature *for at least 12 hours* in the heat treatment".

4. It is to be noted that applicants' amendment with respect to claims 10, 16, and 17 is not entered because the amendment as to these claims is not in compliance with 37 CFR 1.121 © (ii). See MPEP 714.19(O) and MPEP 714.22. Specifically, in claim 10, the limitation "wherein the coil comprises spirals that are separated by an intervening material" was never present in the original claim 10 (instead, the original claim 10 had a limitation, "wherein the method is applied to a stack of at least 100 precursors"). In claim 16, the limitation "the heat treatment step being carried out in an oven which provides an atmosphere whose relative humidity is at least 25%"

was never present in the original claim 16 (instead, the original claim 16 had a limitation, "wherein the coating comprises insolubilizer means which acts to inhibit the dissolution of the coating in a developer prior to imaging"). In claim 17, the limitation "the heat treatment step being carried out in an oven which provides an atmosphere whose absolute humidity is at least 0.028" was never present in the original claim 17 (instead, the original claim 17 had a limitation, "the heat treatment step taking place under conditions which inhibit the removal of moisture from the precursor during the heat treatment"). For these reasons, original claims 10, 16, and 17 instead of the amended claims 10, 16, and 17 are being examined.

5. In view of the amendment on claim 1 (which incorporated the subject matter of previous claim 7), the previously made rejections on claims 1-6, 8, 12, and 16 over Nakao'942, the previously made rejections on claims 1, 2, 11, 12, 14, and 16 over Yoshioka'108, the previously made rejections on claims 3-6 and 8 over Yoshioka'108 in view of Dammel'420, the previously made rejections on claims 1-6, 8, and 12-16 over Takata'471 in view of Nakao'942, and the previously made rejections on claims 1-6, 8, and 11-16 over Takata'471 in view of Yoshioka'108 are hereby withdrawn because none of the cited prior arts teaches or suggests the present limitation of holding the precursor in an elevated temperature *for at least 12 hours* in the heat treatment as presently required in the amended claim 1.

6. Due to newly cited prior arts, the previously indicated allowability of claim 7 is hereby withdrawn, and the following rejections are made *non-final*.

7. Claims 1-6, 8, 11, 13-19, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by McCullough et al (WO 99/21715) (with Dammel et al (5,510,420) cited here to show that typical novolak resins have glass transition temperature between 90-120°C).

McCullough teaches (pg.4, lines 9-17, pg.10, lines 11-19) a method of manufacturing a *printing form precursor* which comprises a coating on a substrate, the coating comprising a *positive* working composition which comprises a *phenolic resin (particularly novolak resin)*, wherein the method comprises the application of the composition in a solvent to the substrate, the drying of the composition, and the subsequent *heat treatment* of the coated substrate. McCullough furthermore teaches (pg.6, lines 25-27) that by carrying out a suitable heat treatment, the sensitivity of the composition may be rendered less variable over time. McCullough also teaches (pg.7, lines 33-35, pg.8, lines 1-4) that they favor carrying out the heat treatment preferably for *at least 24 hours* and at a temperature of *at least 40°C and not excess of 90°C.* In Example 1, McCullough's heat treatment is carried out as follows; individual plate samples (which comprises dried coating formulations coated onto substrates) are covered with interleaving (a *polythene* coated paper No.22) , wrapped in paper (unbleached, unglazed Kraft 90 gm^{-2}, coated with matt black low density polythene 20 gm^{-2}, and placed in an Gallenkamp hotbox oven with fan at 50°C for 0, 2, 3, 5, and 12 days respectively. Since applicants in their Example 1 also use *polythene* to wrap their precursors before placing them in an oven (fore 3 days at 55°C), it is the Examiner's position that the prior art teaches present limitation "the heat treatment step taking place under conditions which inhibit the removal of moisture from the

precursor during the heat treatment". Therefore, the prior art teaches present inventions of claims 1-5, 8, 11, 17, and 19.

With respect to present claim 6, it is known in the art that typical novolak resins have glass transition temperatures between 90-120°C as evidenced by Dammel et al, col.1, lines 48-50. Therefore, when one carries out McCullough's heating treatment at 50°C as taught in his Example 1, it would inherently be the case that the glass transition temperature of the novolak resin (90-120°C) is not exceeded in the heat treatment as presently claimed in claim 6. Therefore, the prior art teaches the present invention of claim 6.

With respect to present claim 13, McCullough teaches (pg.6, lines 20-22) that his composition is preferably such that its solubility in a developer is not increased by incident UV radiation, and thus the prior art teaches present invention of claim 13.

With respect to present claim 14, McCullough teaches (pg.11, lines 12-34) that his composition is preferably patternwise solubilized by heat, during the pattern forming exposure process, by using direct heat or charged-particle radiation, for example electron beam radiation. Therefore, the prior art teaches present invention of claim 14.

With respect to present claim 15, McCullough teaches (pg.12, lines 15-29) that more preferably, his compositions can be exposed directly by means of a laser emitting radiation at above 600 nm and below 1400 nm and that in such compositions a suitable radiation absorbing compound such as carbon black or graphite can be used to convert the radiation to heat. Therefore, the prior art teaches present invention of claim 15.

McCullough teaches (pg.25, lines 7-16) a positive working lithographic printing form precursor having a coating comprising of a composition comprising an active polymer and a *reversible insolubilizer compound* coated on a support wherein the aqueous developer solubility of the composition is increased on heating and that the aqueous developer solubility of the composition is not increased by incident UV radiation, and thus the prior art teaches present invention of claim 16.

With respect to present claim 18, since McCullough teaches the present steps (a) and (b) of claim 18, it is the Examiner's position that the method taught by McCullough would inherently be capable of forming an electronic part precursor as present claimed in claim 18.

With respect to present claim 21, in his Example 1, after the heat treatment, McCullough imagewise exposes his heat-treated plates using the Creo Trendsetter at 7 watts and then develop the plates using a Horsell Mercury Mark V plate processor containing developer. Therefore, the prior art teaches present invention of claim 21.

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over McCullough (WO 99/21715) in view of Nakao et al (5,667,942).

McCullough with respect to claim 1 is discussed above in Paragraph 7. McCullough does not teach the presently claimed method of inhibiting the removal of moisture by carrying out the heat treatment in an environment having elevated moisture content. Nakao teaches a resist pattern forming method which includes: (I) an application step of applying a photoresist onto a semiconductor substrate; (ii) a prebake step (before the imagewise exposure) of prebaking the

photoresist *in an atmosphere containing water vapor* following the application of the photoresist to the substrate; (iii) an exposure step of exposing the photoresist to radiation following the prebake step; (iv) a heating step of heating the photoresist following the exposure step; and (v) a development step of developing the photoresist following the heating step. See abstract. Nakao's method is intended to control the water content in a resist film for *improvement of sensitivity* of the resist (see col.2, lines 23-28). That is, the prebake step is conducted in an atmosphere containing water vapor, so that a large amount of water is imparted to and therefore becomes present in the resist film for *high solution speed of an exposed part into developer*, with a result of *high resist sensitivity* (see col.3, lines 23-28). Based on Nakao's teaching, it is the Examiner's position that it would have been obvious to carry out McCullough's heat treatment in an atmosphere containing water vapor as taught by Nakao so as to obtain high solution speed of an exposed part into developer which would result in high resist sensitivity. Therefore, McCullough in view of Nakao would render obvious present invention of claim 12.

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over McCullough (WO 99/21715) in view of Yoshioka (6,002,108).

McCullough with respect to claim 1 is discussed above in Paragraph 7. McCullough does not teach the presently claimed method of inhibiting the removal of moisture by carrying out the heat treatment in an environment having elevated moisture content. Yoshioka teaches (col.1, lines 5-7) a baking apparatus and a baking method for baking a resist film coated on a substrate such as a semiconductor wafer. After the surface of the wafer is coated with a photoresist, it is

then exposed to light together with a predetermined pattern, and developed (col.1, lines 11-14). Yoshioka states (col.1, lines 20-23) that the series of resist processing steps include various baking processes performed for different purposes, and that prebake is made *to stabilize the resist*. Yoshioka teaches (col.1, lines 54-67, col.2, lines 1-8) that his baking apparatus comprises a *casing surrounding a substrate*, a hot plate for heating the substrate in the casing, a gas supply mechanism for *supplying a H_2O component containing humidity gas into the casing*, and preferably further comprises a cover provided closely to the substrate in the casing for forming a process space for baking the resist film between the cover and the substrate. If such a small process space is formed between the cover and the substrate, H_2O component contained in the humidity gas can be efficiently reacted with the resist film, with the result that *a quality of the resist film is improved, increasing the throughput of the baking process*. Yoshioka clearly teaches (col.6, lines 56-57) that his baking apparatus is used for baking process such as *prebake for stabilizing the resist before light exposure*, as well as post exposure bake after the light exposure. Based on Yoshioka's teaching, it is the Examiner's position that it would have been obvious to one of ordinary skill in the art to carry out McCullough's heat treatment using Yoshioka's apparatus in order to improve the quality of the resist film and to stabilize the resist before the light exposure as taught by Yoshioka. Therefore, McCullough in view of Yoshioka would render obvious the present invention of claim 12.

10. Claims 17,18, 20, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakao et al (5,667,942).

Nakao teaches a resist pattern forming method (for forming a resist pattern in a lithographic step in a semiconductor device fabrication process) which includes: (I) an application step of applying a photoresist onto a semiconductor substrate; (ii) a prebake step (before the imagewise exposure) of prebaking the photoresist *in an atmosphere containing water vapor* following the application of the photoresist to the substrate; (iii) an exposure step of exposing the photoresist to radiation following the prebake step; (iv) a heating step of heating the photoresist following the exposure step; and (v) a development step of developing the photoresist following the heating step. See abstract. Nakao's method is intended to control the water content in a resist film for improvement of sensitivity of the resist (see col.2, lines 23-28). That is, the prebake step is conducted in an atmosphere containing water vapor, so that a large amount of water is imparted to and therefore becomes present in the resist film for high solution speed of an exposed part into developer, with a result of high resist sensitivity (see col.3, lines 23-28). Also, Nakao teaches a positive type resist made of novolak resin, and naphthoquinonediazido photosensitizer. Therefore, the prior art teaches the present invention of claims 18, 20, and 21.

With respect to present claim 17, since Nakao teaches the present steps (a) and (b) of claim 17, it is the Examiner's position that Nakao's method would inherently be capable of forming a printing form precursor as presently recited.

11. Claims 17, 18, 20, and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Yoshioka (6,002,108).

Yoshioka teaches (col.1, lines 5-7) a baking apparatus and a baking method for baking a resist film coated on a substrate such as a semiconductor wafer. After the surface of the wafer is coated with a photoresist, it is then exposed to light together with a predetermined pattern, and developed (col.1, lines 11-14). Yoshioka states (col.1, lines 20-23) that the series of resist processing steps include various baking processes performed for different purposes, and that prebake is made to stabilize the resist. Yoshioka teaches (col.1, lines 54-67, col.2, lines 1-8) that his baking apparatus comprises a casing surrounding a substrate, a hot plate for heating the substrate in the casing, a gas supply mechanism for supplying a H_2O component containing humidity gas into the casing, and preferably further comprises a cover provided closely to the substrate in the casing for forming a process space for baking the resist film between the cover and the substrate. If such a small process space is formed between the cover and the substrate, H_2O component contained in the humidity gas can be efficiently reacted with the resist film, with the result that a quality of the resist film is improved, increasing the throughput of the baking process. Yoshioka clearly teaches (col.6, lines 56-57) that his baking apparatus is used for baking process such as *prebake for stabilizing the resist before light exposure*, as well as post exposure bake after the light exposure. Also, Yoshioka teaches (col.3, lines 4-65, col.4, col.5, lines 1-40) a chemically amplified resist comprising an acetal-protected polyhydroxystyrene, which is alkali-insoluble before the exposure but becomes alkali-soluble upon exposure in the presence of a photoacid generator. Therefore, the prior art teaches the present inventions of claims 18, 20, and 21.

With respect to present claim 17, since Yoshioka teaches the present steps (a) and (b) of claim 17, it is the Examiner's position that the prior art's method would inherently be capable of forming a printing form precursor as presently recited.

12. Claims 17-19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takata et al (6,143,471) in view of Nakao et al (5,667,942).

Takata teaches (col.2, lines 52-65) a *positive* type photosensitive composition capable of making a lithographic printing plate comprising a polymer which is soluble in an alkaline developer, a near infrared rays-absorbing dye, and a compound which lowers solubility of the polymer in the alkaline developer. Takata dissolves his positive photosensitive composition in a solvent and coats it on a support (col.32, lines 62-67). After the coating and drying, a lithographic printing plate is prepared by imagewise exposing the positive photosensitive composition (by irradiating with a semiconductor laser which irradiates near infrared rays at a wavelength of 700-900 nm) and then developing the exposed plate material using an alkaline developer (see col.33, line 15, lines 56-60, col.34, lines 31-32). Takata teaches (see Example 1) that the drying step (after the coating of the photosensitive composition) is done at 40°C for 20 minutes. However, Takata does not does not teach the presently claimed heat treatment step in which removal of moisture from the precursor is inhibited during the heat treatment. Nakao teaches (col.2, lines 23-37) that carrying out a prebake step (after applying a photoresist onto a substrate) in an atmosphere containing water vapor improves sensitivity of the photoresist. Based on Nakao's teaching, it would have been obvious to one of ordinary skill in the art to carry

out Takata's drying step (at 40°C for 20 minutes) in an atmosphere containing water vapor in order to improve sensitivity of the photoresist as taught by Nakao. Therefore, Takata in view of Nakao would render obvious the present inventions of claims 17, 19, and 21.

With respect to present claim 18, since Takata in view of Nakao teach the present steps (a) and (b) of claim 18, it is the Examiner's position that the method taught by Takata in view of Nakao would inherently be capable of forming an electronic part precursor as present claimed in claim 18.

13. Claims 17-19, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takata et al (6,143,471) in view of Yoshioka (6,002,108).

Takata teaches (col.2, lines 52-65) a *positive* type photosensitive composition capable of making a lithographic printing plate comprising a polymer which is soluble in an alkaline developer, a near infrared rays-absorbing dye, and a compound which lowers solubility of the polymer in the alkaline developer. Takata dissolves his positive photosensitive composition in a solvent and coats it on a support (col.32, lines 62-67). After the coating and drying, a lithographic printing plate is prepared by imagewise exposing the positive photosensitive composition (by irradiating with a semiconductor laser which irradiates near infrared rays at a wavelength of 700-900 nm) and then developing the exposed plate material using an alkaline developer (see col.33, line 15, lines 56-60, col.34, lines 31-32). Takata teaches (see Example 1) that the drying step (after the coating of the photosensitive composition) is done at 40°C for 20 minutes. However, Takata does not does not teach the presently claimed heat treatment step in

which removal of moisture from the precursor is inhibited during the heat treatment. Yoshioka teaches (col.1, lines 22-23, lines 53-67, col.2, lines 1-8, col.6, lines 56-57) a prebaking step using a baking apparatus which has a casing surrounding a substrate and a gas supply mechanism for supplying a H_2O component containing humidity gas in order to stabilize the resist. Based on Yoshioka's teaching, it would have been obvious to one of ordinary skill in the art to carry out Takata's drying step (at 40°C for 20 minutes) using Yoshioka's baking apparatus in order to stabilize the resist. Therefore, Takata in view of Yoshioka would render obvious the present inventions of claims 17, 19, and 21.

With respect to present claim 18, since Takata in view of Yoshioka teach the present steps (a) and (b) of claim 18, it is the Examiner's position that the method taught by Takata in view of Nakao would inherently be capable of forming an electronic part precursor as present claimed in claim 18.

14. Claim 9 is allowed. None of the cited prior arts teaches or suggests applying the heat treatment to a precursor coil.

15. Claim 10 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Although McCullough teaches applying his heat treatment to 13 plates packet (see Example 9), the prior art does not teach or suggest that his heat treatment can be applied to a stack of at least 100 precursors as presently claimed in claim 10.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is (703) 305-0504. The examiner can normally be reached on Monday-Friday from 8:30 am EST to 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ms. Janet Baxter, can be reached on (703) 308-2303. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9311 for after final responses or (703) 872-9310 for before final responses.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0661.

S. J. L.

S. Lee
March 18, 2002

JANET BAXTER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700